

CLAIMS

- 1 1. A method of fabricating a semiconductor device comprising the steps of:
2 depositing multiple layers of semiconductor material
3 on a supporting substrate to form the semiconductor device; and
4 depositing at least one layer of the multiple layers in the presence of a surfactant.
- 1 2. The method of claim 1 wherein the surfactant is chosen from the group consisting
2 of antimony, indium, bismuth and thallium.
- 1 3. The method of claim 1 wherein the surfactant and semiconductor material is in a
2 flux ratio in a range of approximately from 0.0001 to 0.1.
- 1 4. The method of claim 1 wherein the semiconductor material includes aluminum
2 and gallium.
- 1 5. The method of claim 4 wherein the surfactant includes antimony.
- 1 6. The method of claim 5 wherein the at least one layer is grown with the supporting
2 substrate at a temperature in a range from approximately 400 °C to 800 °C.
- 1 7. The method of claim 6 wherein the flux ratio is in a range of approximately
2 0.0001 to 0.1.
- 1 8. The method of claim 1 wherein the semiconductor device includes at least one of
2 a high electron mobility transistor, a vertical cavity surface emitting laser, an edge emitting laser,
3 a heterostructure bipolar transistor, a resonant tunneling diode, and the like.
- 1 9. A method of fabricating a semiconductor laser comprising the steps of:
2 depositing a plurality of layers of semiconductor material including at least one
3 active area with opposed major surfaces and a cladding layer adjacent each opposed major
4 surface; and
5 at least one of the active area and the cladding layers being deposited in the
6 presence of a surfactant.

1 10. The method of claim 9 wherein the surfactant is chosen from the group consisting
2 of antimony, indium, bismuth and thallium.

1 11. The method of claim 9 wherein the surfactant and semiconductor material is in a
2 flux ratio in a range of approximately from 0.0001 to 0.1.

1 12. The method of claim 9 wherein the semiconductor material includes aluminum
2 and gallium.

1 13. The method of claim 12 wherein the surfactant includes antimony.

1 14. The method of claim 13 wherein the at least one layer is grown with the
2 supporting substrate at a temperature in a range from approximately 400 °C to 800 °C.

1 15. The method of claim 14 wherein the flux ratio is in a range of approximately
2 0.0001 to 0.1.

1 16. A semiconductor device comprising:
2 a plurality of layers of semiconductor material epitaxially grown one on another;
3 and
4 at least one of the semiconductor layers including a surfactant with the
5 semiconductor material.

1 17. A semiconductor device as claimed in claim 16 wherein the surfactant is chosen
2 from the group consisting of antimony, indium, bismuth and thallium.

1 18. A semiconductor device as claimed in claim 17 wherein the surfactant and
2 semiconductor material are in a flux ratio in a range of approximately from 0.0001 to 0.1.

1 19. A semiconductor device as claimed in claim 16 wherein the semiconductor
2 material includes one of aluminum and gallium.

1 20. A semiconductor device as claimed in claim 19 wherein the surfactant includes
2 antimony.

1 21. A semiconductor device as claimed in claim 20 wherein the flux ratio is in a range
2 of approximately 0.0001 to 0.1.

1 22. A semiconductor device as claimed in claim 16 wherein the semiconductor device
2 includes at least one of a high electron mobility transistor, a vertical cavity surface emitting laser,
3 an edge emitting laser, a heterostructure bipolar transistor, a resonant tunneling diode, and the
4 like.